

REMARKS

These remarks and the accompanying amendments are responsive to the most recent Office Action mailed December 17, 2003 (hereinafter referred to as "the Office Action"). Claims 1-11 were pending at the time of the last examination. The Office Action rejected Claims 1-11 under 35 U.S.C. 102(e) as being anticipated by United States patent number 6,285,655 issued to Lundby et al (hereinafter referred to simply as "Lundby"). By this amendment Claims 1-11 are cancelled, and Claims 12-23 are added.

The added claims are similar to the cancelled claims, but with some rewriting for clarity. For example, the following listing shows pairs of similar claims:

New claim 12 replaces cancelled claim 1,
New claim 13 replaces cancelled claim 2,
New claim 14 replaces cancelled claim 3,
New claim 15 replaces cancelled claim 4,
New claim 16 replaces cancelled claim 5,
New claim 18 replaces cancelled claim 6,
New claim 19 replaces cancelled claim 7,
New claim 21 replaces cancelled claim 8,
New claims 17 and 20 replace cancelled claim 9,
New claim 22 replaces cancelled claim 10, and
New claim 23 replaces cancelled claim 11.

New Claims 12, 16 and 17

As recited in Claims 12 and 16, one base station transmits "a signal of each of a plurality of channels included in each of a plurality of channel groups". See, for an example, Figures 4 and 5 of the present specification. As further recited in Claims 12 and 16, a signal of each channel of each channel group is spread "by using an orthogonal code and a spreading code." An example of the orthogonal code is a channelization code. An example of a spreading code is a scrambling code. As further recited, the "spreading codes for use in spreading signals of respective channel groups differ from each other, [and] orthogonal codes for use in spreading signals of respective channels in each channel group differ from each other." In addition, "channels of each channel group include a pilot channel." Here, "a signal transmitted over the pilot channel undergoes data modulation by a known pattern or does not undergo any data modulation."

In sharp contrast, Lundby discloses that for effectively making an area for each place by splitting beams, a base station 4 comprising a plurality of beam antennas 116 provides a pilot channel for each beam.

The Office Action implies that the prior Claims 1 and 5 lack novelty in view of Figure 3 of Lundby and the Lundby passages spanning from column 4, lines 21-26 and column 6, lines 30-58. The Office Action also implies that a Walsh sequence (provided to the multipliers 222 and 234) of Lundby et al. corresponds to the orthogonal code recited in the prior Claims 1 and 5. However, Lundby does not disclose a code corresponding to a "spreading code" recited in Claim 1 and 5. Therefore, Lundby et al. does not disclose that one base station treats a plurality of channel groups or, in other words, that the base station uses a plurality of spreading codes corresponding to respective channel groups. Further, Lundby does not disclose that a pilot channel is provided for each channel group. In addition, the base station in Figure 3 of Lundby

only transmits a plurality of pilot signals by using a plurality of Walsh sequences in one channel group.

Therefore, the prior Claims 1 and 5 (and their rewritten forms in Claims 12 and 16) have novelty over Lundby. Claim 17 depends from Claim 16, and is also patentable at least based on dependency from Claim 16.

New Claims 13, 14, 18, 19 and 20

As recited in Claims 13 and 18, one base station transmits "a signal of each of a plurality of channels included in each of a plurality of channel groups." A signal of each channel of each channel group is spread "by using an orthogonal code and a spreading code." Furthermore, "spreading codes for use in spreading signals of respective channel groups differ from each other, [and] orthogonal codes for use in spreading signals of respective channels in each channel group differ from each other." In addition, "channels of the channel groups include a pilot channel." Here, however, "a signal of the pilot channel is transmitted with a symbol rate higher than a minimum symbol rate defined in the CDMA mobile communication system" (emphasis added). The "signal transmitted over the pilot channel undergoes data modulation by a known pattern or does not undergo any data modulation."

The Office Action implies that the prior Claims 2 and 6 (corresponding to the replacement Claims 13 and 18) lack novelty in view of Figure 3 of Lundby as well as the Lundby passages of column 4, lines 21-26, and column 9, lines 20-49 of Lundby et al. Many of the recited features of Claim 13 and 18 are the same as those discussed above with respect to Claims 12 and 16, and as set forth above, are not described by Lundby. Furthermore, with respect to the above-underlined recited feature of Claims 13 and 18, the cited passages only mention that the

communication data rate of a mobile station can be increased by reducing interference from other sectors. There is no description regarding a symbol rate of a signal of a pilot channel. Therefore, Lundby also does not describe that "a signal of the pilot channel is transmitted with a symbol rate higher than a minimum symbol rate defined in the CDMA mobile communication system".

Therefore, the prior Claims 2 and 6 (and their rewritten forms in Claims 13 and 18) have novelty over Lundby. Claim 14 depends from Claim 13, and is also patentable at least based on dependency from Claim 13. Furthermore Claims 19 and 20 depend from Claim 18, and are also patentable at least based on dependency from Claim 18.

Further points of novelty with respect to Claims 14 and 19

As recited in Claims 14 and 19, "the symbol rate higher than the minimum symbol rate is determined in accordance with a relationship between transmission power of each channel and channel capacity." With respect to the prior Claims 3 and 7, which are replaced by the current Claims 14 and 19, the Office Action implies that these claims lack novelty in view of the Lundby passage of column 7, lines 30-42. However, this passage only describes that the power of a pilot channel can be reduced when an antenna beam is sharp. There is no description regarding a symbol rate of a signal of a pilot channel. Therefore, for this additional reason, Claims 14 and 19 are patentable over Lundby.

New Claims 15 and 21

As recited in Claims 15 and 21, one base station transmits "a signal of each of a plurality of channels included in each of a plurality of channel groups." A signal of each channel of each

channel group is spread "by using an orthogonal code and a spreading code." Furthermore, "spreading codes for use in spreading signals of respective channel groups differ from each other, [and] orthogonal codes for use in spreading signals of respective channels in each channel group differ from each other." In addition, "channels of each channel groups include a pilot channel." The "signal transmitted over the pilot channel undergoes data modulation by a known pattern or does not undergo any data modulation." Also, the base station "transmits a signal of a pilot channel only in one of the channel groups, and does not transmit a signal of pilot channel in another channel group."

On the receiving side, a mobile station receives "signals including signals of the plurality of channels of the plurality of channel groups" and measures "in each channel group, interference power of a channel other than a pilot channel by despread the received signals by using a orthogonal code and a spreading code for use in spreading a signal of the pilot channel of the channel group."

In this way, while the base station transmits the signal of the pilot channel only in one of the channel groups, the mobile station measures, in each of the channel groups (including channel groups which do not transmit the signal of the pilot channel), interference power of a channel other than a pilot channel by despread the received signals by using a orthogonal code and a spreading code for use in spreading a signal of the pilot channel of the channel group. Accordingly, channel capacity is improved, while the accuracy of the interference power measurement is improved.

The Office Action implies that the prior Claims 4 and 8 (corresponding to the new replacement Claims 15 and 21) lack novelty in view of the Lundby passage at column 6, line 59. However, this passage only describes that a channel element 112 comprises at least one pilot

channel. Lundby et al. does not disclose the above-mentioned features of the present invention of prior claim 4 and 8. Therefore, the corresponding replacement claims 15 and 21 are also patentable over Lundby.

New Claims 22 and 23

As recited in Claim 22, a mobile station receives "signals including signals of the plurality of channels of the plurality of channel groups" in which the signal of each channel of each channel group is "spread by using an orthogonal code and a spreading code." Furthermore, "spreading codes for use in spreading signals of respective channel groups differ from each other, [and] orthogonal codes for use in spreading signals of respective channels in each channel group differ from each other. In addition, "channels of each channel group include a pilot channel." Here, a signal transmitted over the pilot channel undergoes data modulation by a known pattern or does not undergo any data modulation. Also, in each channel group, the mobile station "measures interference power of a channel other than a pilot channel by despreading the received signals by using a orthogonal code and a spreading code for use in spreading a signal of the pilot channel of the channel group."

The Office Action implies that the prior Claim 10 (corresponding to replacement Claim 22) lacks novelty in view of the Lundby passages of column 6, lines 46-52 and column 7, line 58 to column 8, line 19. However, these passages merely describe that there is only description that the pilot signal is discovered and filtered, and a vector corresponding to the discovered data is projected onto a vector corresponding to the filtered pilot, and the amplitude of the vectors are multiplied. There is no disclosure regarding measuring the interference power by using the pilot signal. Therefore, there is no disclosure regarding "measuring, in each channel group,

interference power of a channel other than a pilot channel by despread the received signals by using an orthogonal code and a spreading code for use in spreading a signal of the pilot channel of the channel group."

Therefore, the prior Claim 10, and the replacement Claim 22 is patentable over Lundby. Claim 23 depends from Claim 22 and is thus patentable for at least the reasons that Claim 22 is patentable.

Accordingly, favorable action is respectfully requested. In the event that the Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview, the Examiner is requested to contact the undersigned attorney.

Dated this 17th day of March, 2004.

Respectfully submitted,



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